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AUTHOR McKee, Barbara G.
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ABSTRACT

An attitude rating scale and instructional assessment survey were administered in 62 classes at the State University of New York at Cortland to examine the relationship between student ratings of instruction and students' course-oriented attitudes. The Adjective Rating Scale (ARS) was designed to measure course and program-oriented attitudes, and the Instructional Development and Effectiveness Assessment (IDEA) Survey was designed to define teaching effectiveness through student ratings of course objectives and instructional behaviors. Sample items from both instruments are appended. Interest/affect, practical value, negative affect, and difficulty factors were extracted from preliminary analysis of the ARS. Faculty teaching style, faculty empathy towards students, student cognitive gain, examinations, student personal gain, course organization, and student workload were identified from preliminary factor analysis of the IDEA Survey. Canonical variate analysis was implemented to determine the common variance of the IDEA and ARS. Student course-oriented atttitudes and student ratings of instruction were highly related, and overlapped in three dimensions: difficult courses taught by instructors with little empathy, courses with high interest/affect taught by good instructors, and courses with little practical value but high affect and student personal gain. Those researching student ratings of instruction are urged to integrate their work with materials concerning attitude structure, acquisition, and change. (Author/JAC)

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THE RELATIONSHIP BETWEEN STUDENTS' COURSE-ORIENTED ATTITUDES AND STUDENT RATINGS OF INSTRUCTION: A CANONICAL VARIATE ANALYSIS

Barbara G. McKee
Assistant Professor and Evaluation Specialist
Curriculum Development/Research Department
Rochester Institute of Technology
Rochester, New York 14623

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meeting of the American Educational Research Association
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The Relationship Between Students' Course-Oriented Attitudes and Student Ratings of Instruction: A Canonical Variate Analysis

Barbara G. McKee
Rochester Institute of Technology

This study employed canonical variate analysis with a redundancy measure to examine the direction and intensity of the relationship between student ratings of instruction and students' course-oriented attitudes. A measure of students' course-oriented attitudes and a student rating of instruction form were administered to sixty college classes. Canonical variate analysis of the two instruments yielded three significant variates. Results indicated a strong relationship between the two concepts and educational researchers interested in student ratings of instruction were urged to integrate their work with the social science literature on the structure, acquisition, and change of attitudes.

BACKGROUND AND STATEMENT OF THE PROBLEM

Student ratings of instruction have become a part of the evaluation of instruction in many colleges. It is therefore desirable to know as much as possible about the properties of such ratings. The literature on college students' ratings of instruction dates from the 1920's, but there is little consistent agreement as to what ratings actually measure (Centra, 1972).

One of the unexplored areas of student ratings of instruction is the relationship between such ratings and students' course-oriented attitudes. Rosenshine recently noted the confusion between the terms "student ratings of" and "student attitudes toward" instruction.

> . . . the term student ratings has been used in this discussion section, but the term student attitudes was used in earlier paragraphs. The items used by Flanders to measure student attitude seem quite similar to the items in the student rating form used by Gage (1972). Currently, student ratings of a teacher and student attitudes toward a teacher are terms with overlapping meaning, but it may be necessary to begin to separate these terms in future research. (Rosenshine, 1973, p. 180)

The relationship between attitudes and ratings has been explored neither in the literature on student ratings of instruction nor in the social science literature on attitude measurement. Osgood (1957) stated that an attitude can be considered the evaluative dimension of response to a concept or word and that this dimension was invariant over concepts and cultures. Student ratings of instruction also constitute an evaluative act, but the relationship between

these two evaluative activities has not been explored.

The research suggesting that different persons hold different attitudes toward the entire field of education was initiated by Kerlinger (1959, 1961, 1963). His work in 1967 and with Pedhauzer in 1968 suggests that different people hold discrete social attitudes toward education generally and toward desirable teacher characteristics in particular. Kerlinger advanced the notion that, in the case of educational attitudes, the universe of referents is assumed to fall into two subjects forming a basic dualism that is expressed in the concepts "progressivism" and "traditionalism." Individuals with progressive attitudes toward education, in selecting traits they believe to be desirable in teachers, choose person-oriented traits that are congruent with progressive educational beliefs. Individuals with traditional attitudes toward education choose task-oriented traits that are congruent with traditional educational beliefs (Kerlinger, 1967). Kerlinger's work helped identify the multidimensional structure of attitudes toward education and kicked off a spate of studies during the sixties and early seventies that investigated the attitudes of different groups regarding education (Chapman, 1975).

Preceding the more general work by Kerlinger, Remmers, referring to student ratings of instruction, had spoken of the "growing use of opinion and attitude instruments in education." "More work has been done in this field than in any previous one; at the elementary level, at the secondary and at the college level, students are being given an opportunity to express

their attitudes in ways capable of being measured" (Remmers, 1954, p. 400). Remmers described the Purdue Rating Scale and its elementary school version, the Diagnostic Teacher Rating Scale. In 1954, then, Remmers made no distinction between student ratings of instruction and students' attitudes toward courses or instructors.

Many researchers have followed in Remmers' steps. Examination of several studies that claim to examine student attitudes toward instruction makes clear that what these studies actually utilize is forms for student ratings of instruction. Few researchers have bothered to suggest a difference between student ratings of, and student attitudes toward, instructors and courses.

Good and Good (1973) discussed attitude similarity and instructor evaluation; however, the attitudes used in their study were not attitudes toward courses or instructors, but social attitudes of students, such as opposition to divorce, which they correlated with student ratings.

Tobias and Hanlon (1975) cite the traditional literature on attitudes and behavioral intentions (Staats, 1967; Fishbein, 1971) in their study entitled Attitudes Toward Instructors, Social Desirability and Behavioral Intentions, but their measure of "attitude" contains items found on most student ratings forms. In fact, they state they obtained their items from a rating scale reported by McKeachie (1971).

Granzin and Painter (1973) did draw a distinction between attitudes and course ratings. Their attitude measure

contained such items as contribution of a course to general education, contribution of a course to vocational education, interest and entertainment level of course, ease of course, grade expected, grade capable of, and grade deserved. The last five items are frequently found on student ratings forms; the first two generally are not. The variables that they term "student ratings" are, in fact, three items: overall rating of course experience, course content rating, and overall instructor effectiveness rating. The three general ratings were used as criterion variables, and the 22 more specific items were used as predictor variables in a multiple regression study.

There is a clear paucity of studies that attempt to differentiate between student attitudes toward a course and student ratings of a course. If a distinction is to be made between these two terms, further studies must be conducted. Researchers who have investigated student ratings have, for the most part, simply ignored any distinction between these two terms and have used attitudes toward instruction and ratings of instruction interchangeably if they used the term attitude at all. Psychologists and other social scientists interested in the structure, acquisition, and change of attitudes, on the other hand, have not traditionally been concerned with attitudes toward an object as limited in time and setting as a specific course.

As Rokeach (1970) has pointed out, attitude theorists have generally been more interested in the theory and measurement

of attitudes toward objects, across situation, than in the theory and measurement of attitudes toward situations, across objects (p. 118). He goes on to say that we have, for example, scales that measure attitudes toward the Negro, the church, labor, and socialism. We do not have scales that measure attitudes toward such situations as managing or eating in a restaurant, being a passenger or driver of a bus, buying or selling real estate. As a result, the study of attitudes-toward-situations has become more or less split off from the study of attitudes-toward-objects. To account for the ways people behave in specific situations, personality psychologists typically use terms or concepts such as traits, and social psychologists use terms or concepts such as role.

"The splitting-off of attitude-toward-situation from attitude-toward-objects has, in the writer's (Rokeach) opinion, severely retarded the growth of attitude theory" (p. 119). It has resulted in a failure to appreciate that an attitude object is always encountered within some situation, about which we also have an organized attitude. Rokeach goes on to say that this splitting-off has resulted in unsophisticated attempts to predict behavior accurately on the basis of a single attitude-toward-object, ignoring the equally relevant attitude-toward-situation. This preoccupation with attitude objects that occurs in a variety of settings partially explains why attitude theorists have not traditionally been concerned with an object as specific as a course. A course is encountered in (in many ways, is) a situation, whereas attitudes toward education or attitudes toward an "ideal" professor can be considered situationless.

This study examined an area of concern that has been minimally explored in the research concerning student ratings of instruction. The relationship between student attitudes toward a course and student ratings of instruction. Research of this type was suggested by Resenshine (1973) when he noted the confusion between the terms "student ratings of" and "student attitudes towards" instruction. The relationship between student responses on an instrument designed to assess student attitudes toward college courses and an instrument designed to obtain student ratings of instruction was examined.

This study focused on the following question:

> What is the relationship between student attitudes toward a course as measured by the Adjective Rating Scale (ARS) and student rating of instruction as measured by the Instructional Development and Effectiveness Assessment Survey (IDEAS)?

A clarification of the relationship between student course-oriented attitudes and student ratings of instruction would be valuable information to several different groups. First, if there is a relationship, a large and important body of research dealing with attitude measurement and attitude change would become accessible to investigators conducting research on student ratings of instruction. Second, if it can be shown that a student attitude instrument can be used to obtain the same rank ordering of instructors and courses as that of a student rating instrument, educators would have an easier, quicker, and less threatening way of obtaining such rank ordering information for administrative decision making. Determining a satisfactory methodology to explore the

relationship mentioned above was a second concern addressed in this study. In order to determine the degree to which the two measures mentioned above shared a common variance, while at the same time allowing each measure to retain its integrity, canonical variate analysis with a redundancy measure was selected as the appropriate statistical procedure. While certainly not a new or unique analysis procedure, the previous use of canonical variate analysis in research concerning student ratings of instruction has been minimal.

METHODOLOGY

Sample

Sixty-two faculty members at the State University of New York College at Cortland participated in this study. The faculty members were chosen on several pragmatic criteria. An attempt was made to include every department in the college, and to include some faculty who traditionally teach upper division courses and some who traditionally teach lower division courses in order to force a larger representation of students, and finally, the faculty involved (with a few exceptions) were known to the principal investigator.

The adjective Rating Scale (ARS), a measure of course-oriented attitudes, was administered to 62 classes at the State University College at Cortland during the final two weeks of the 1976 fall semester. The Instructional Development

and Effectiveness Assessment (IDEA) Survey, a student rating of instruction survey, was administered to the students at the same time.

The 62 classes in this study reported an average enrollment of 34.8 students per class. This compares to an average class size of all courses offered at Cortland in the fall of 1975 of 26.5 students. The average attendance per class for the completion of the post-course instruments equaled 26.7 students per class. This was an average completion rate of 76%.

To gain some understanding of the representativeness of the faculty sample, several Chi-Square tests were made comparing the sample with the total faculty population at Cortland College in the fall of 1975.

The Chi-Square comparisons revealed that the faculty participating in this study did not differ (at the .01 level of significance) from the total faculty population at Cortland College on the demographic variables of sex, rank, years of higher education experience, department, and division. The sample included a slightly smaller percent of faculty having already received tenure compared to the total faculty population. This difference was significant at the .01 level but not at the .05 level of significance.

The demographic variables of sex, age, full or part-time, and class were available both for students who completed the instruments used in this study and for the total population of students at Cortland College. Table 1 presents the

distribution of students enrolled in courses taught by teachers participating in this study and the distribution of the total student population at Cortland College on the demographic variables listed above.

TABLE 1

SELECTED CHARACTERISTICS OF STUDENT SAMPLE PARTICIPATING IN STUDY COMPARED TO TOTAL STUDENT POPULATION AT CORTLAND COLLEGE

Characteristic	Total Cortland Population (A)	Undergraduate Cortland Population (B)	Sample (C)	Chi - Square AxC	Chi - Square BxC
Sex					
Male	42%	42%	41%	N.S.	N.S.
Female	58%	58%	59%	(df=1)	(df=1)
Age					
Under 25	87%	97%	97%	34.3212	N.S.
25 and over	13%	3%	3%	(df=1)	(df=1)
Student Status					
Full-time	83%	97%	97%	200+*	N.S.
Part-time	17%	3%	3%	(df=1)	(df=1)
Class Status					
Freshman	21%	26%	20%		
Sophomore	19%	24%	23%		
Junior or Senior	41%	50%	56%	* 120+* 300+	(df=2)
Graduate	18%		1%	(df=4)	
Other	1%		.0003%		

*p $\geq$ .05

Instrumentation

Adjective Rating Scale. The Adjective Rating Scale (ARS) is a measure of course and program-oriented attitude that has been developed by E.F. Kelly at the Center for Instructional Development, Syracuse University (Kelly, 1975). The scale consists of twenty-four adjectives which are rated against the stimulus, "I have found (or expect) this course to be:" The ratings are taken over a four-point scale, "Extremely," "Very," "Somewhat," "Not at All."

The twenty-four terms on the instrument originally were selected from a large set of adjectives used by students at Syracuse University when they were asked to respond to the stimulus item, "List the three words that best describe the course you have just completed." Terms are chosen for their common usage and bipolarity (Kelly et al., 1976). (See Appendix for copy of instrument)

To investigate the instrument, Kelly and Greco (Kelly et al., 1976) analyzed the ratings of precourse expectations from 769 respondents across six courses.[1] Their study involved two different computer programs and a variety of factor analytic techniques. The basic solution selected was the SPSS Principal Components analysis with varimax rotation (Kelly et al., 1976).

While factor structures appeared somewhat different from group to group, their results suggest "a definite discernible

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[1]The six courses ranged from freshman to graduate level and included English 101, Psychology 205, Marketing 355, General Education 105, Mathematics 117, and several Management courses.

and stable factor structure which accounts for between 60 and 70 percent of the variance." These factors were labeled as Practical Value, Emotional Appeal, Dullness, Interest Value, and Difficulty. Kelly (1975) reported Alpha coefficients ranging from .71 to .85 for the five factors.

Instructional Development and Effectiveness Assessment (IDEA)

The Instructional Development and Effectiveness Assessment Survey was developed by Hoyt (1969a) at Kansas State University. The survey is now copyrighted by the Center for Faculty Evaluation and Development in Higher Education at Kansas State.

The survey was originally developed on the assumption that one method of defining teaching effectiveness was the students' self-ratings of their progress on specific course objectives. Such objectives should represent those that the faculty member felt were emphasized in the course being rated.

Along with the initial development of the ten course objectives, items were developed that obtained student ratings on specific instructional behaviors.

An effort was made to write items which (a) represented a meaningful dimension along which instructors might vary, (b) gave evidence of being related to instructional effectiveness, and (c) described teacher behavior in sufficiently specific terms that, if it seemed desirable to alter the behavior, this could be communicated clearly (Hoyt, 1969b).

Instruments used by other researchers were reviewed. Three appeared especially promising to Hoyt in terms of their comprehensiveness, specificity, and the thoroughness with which

they had been examined statistically. These include the 72-item questionnaire developed by Solomon (1966), the 46-item questionnaire developed by Isaacson, et al. (1964), and the 56-item device developed by Whitlock (1966) (Hoyt, 1969b). The IDEA Survey Form used in this study (see Appendix) is the third version of the form developed by Hoyt. The final version was based on an administration of the instrument in 1973 and 1974 to over 1400 classes at Kansas State University.

Preliminary Analysis

Post-course responses for the Adjective Rating Scale were factor analyzed using the SPSS Principal Components Analysis with a varimax rotation of factor structures with eigenvalues over one. The same procedure was followed for the 38 items of the Instructional Development and Effectiveness Assessment Survey (IDEAS). The factor structures and the labels given each factor for each instrument will be discussed in the Results section of this paper.

Principal components analysis yields a total number of factors equal to the number of variables. Each component is defined as the best linear summary of variance left in the data after previous components are extracted. The first few factors usually explain most of the variance in the data, and generally only those factors with eigenvalues over one are rotated and/or interpreted (Nie, Brent, & Hull, 1970). After rotation, the factor loadings indicate which variables are involved in which factor pattern and to what degree. They can be interpreted like correlation coefficients. The relative

contribution of each variable is an important consideration in labeling a factor. It should be made clear, however, that the process of labeling factors represents a "best guess" of the researcher based on his or her understanding of the solution.

After the factor structures for the post-course ARS and post-course IDEAS were examined and labeled, factor scores were generated for each class. Factor scoring considers the contribution of all variables on a factor where each variable is weighed proportionally to its involvement. A factor score is a composite scale score based on a weighted sum of the individual items using the factor loading as the weights (Armour, 1974). A factor scale, on the other hand, uses only items that load highest on a given factor. Factor scoring retains the orthogonality of the factor structures (assuming one did a principal components analysis and orthogonal rotation). Factor scores were chosen rather than factor scales (factor scales increase the reliability of the factors at the expense of orthogonality) because the loss of orthogonality may preclude the latter use of significance tests that assume independent measures.

Theta reliability estimates, following Armour (1974), were computed for each factor and are reported in the Appendix. Theta reliability coefficients "provide a composite reliability estimate for factor scores based on principal-components analysis" (Armour, 1974, p. 27).

Analysis

The primary question of this study, examined the relationship between student responses on a course-oriented attitude

instrument and student responses on a student rating of instruction instrument. The classroom was chosen as the unit of analysis. It is usually untenable to assume that students' responses are independent of each other because students within a class interact with and affect one another's opinions. Hence, the classroom seemed the proper unit of analysis.

The question was investigated through canonical variate analysis. Factor scores from the pre-course ARS and post-course IDEAS were submitted to the Cooley and Lohnes canonical correlation program (SUCC user library) to determine the number of pairs of canonical variates needed to describe the relationship between these two variable sets.

Canonical variate analysis (CVA) investigates the relationship between two sets of variables and has been described by Tatsuoka (1971) as a kind of "double barrelled principal components analysis" (p. 183). "(CVA) ... identifies the "components" of one set of variables that are most highly related (linearly) to the 'components' of the other set of variables" (p. 183). Each variable set (right and left sides) contributes a weighted composite of variables (canonical variates) whose correlation (canonical correlation) is a measure of the shared variance of the original variable sets. By determining the number of significant canonical correlations (canonical relations), statements can be made about the number and nature of traits needed to explain the relationship between the variable sets (Tatsuoka, 1971).

A redundancy analysis following the suggestions of Cooley and Lohnes (1976) was completed for the canonical variate analysis. The procedure suggested by Cooley and Lohnes was originally developed by Stewart and Love (1968) and is a measure of the "similarity" between two sets of variables. The redundancy analysis suggested by Cooley and Lohnes is a more conservative estimate of the shared variance than the frequently used sum of the squared canonical coefficients.

> If variables in one set (say set Y) are mutually uncorrelated, the sum of squared canonical correlations can be termed "the amount of variance in set Y accounted for sex X." . . . If variables in both sets are uncorrelated within sets, then the sum of squared canonical correlations can be termed "the amount of variance in either set accounted for by the other." . . . The sum of squared canonical correlations is thus a useful measure of similarity between two sets of factors which are uncorrelated within sets, or which could be rotated to be so.
>
> (Darlington, 1973, p. 448)

RESULTS

Preliminary Analysis

As the first step in the analyses of the data collected for this study, a factor analysis of the post-course Adjective Rating Scale was completed. Sixty-two classes comprising 1,664 students completed the post-course Adjective Rating Scale.

The 24 items of the Adjective Rating Scale were submitted to a principal components factor analysis with rotation against the varimax criterion. Four factors with eigenvalues greater than one were extracted accounting for 63.5 percent of the total variance. The four factors were identified and

inspected for characteristic loadings defined as .30 and above. Results of the principal components analysis are displayed in Table 2.

The first factor combines most of the positive adjectives. Items loading highest on this factor are Exciting, Enjoyable, Stimulating, Interesting, Enlightening, Provocative, and Rewarding. Other adjectives loading .30 or above are Good, Different, Worthwhile, Valuable, and Informative. Boring and Dull both have high negative loadings. The factor combines both positive intellectual and positive affective adjectives and hence is labeled Interest/Affect.

The second factor represents a pragmatic or practical scale. Those adjectives loading the highest are Practical, Valuable, Relevant, Necessary and Worthwhile. Other adjectives loading .30 or above are Rewarding, Informative, Good, and Enlightening. Useless, A Waste, and Irrelevant all load negatively on this factor. The factor was labeled Practical Value.

The third factor appears to incorporate most of the negative adjectives. Those items loading most highly on this factor are the following: A Waste, Dull, Useless, Boring, and Irrelevant. General also has a positive loading (.31) on this factor, but does not have as high a positive loading as the clearly negative adjectives. Items that load negatively on this factor are Interesting, Stimulating, Good, and Informative. The factor was labeled Negative Affect.

The fourth factor is clearly an indicator of the

TABLE 2

FOUR-FACTOR STRUCTURE OF PRINCIPAL COMPONENTS ANALYSIS/VARIMAX ROTATION
FOR POST-COURSE ABJECTIVE RATING SCALE
(1,664 CASES)

	FACTORS				
VARIABLES	INTEREST/AFFECT	PRACTICAL VALUE	NEGATIVE AFFECT	DIFFICULTY	COMMUNALITY
INTERESTING	.66	.27	-.39	.04	.65
BORING	-.47	-.02	.65	-.02	.64
RELEVANT	.28	.72	-.26	-.00	.66
INFORMATIVE	.40	.50	-.31	.20	.55
DIFFICULT	-.08	-.02	.13	.85	.75
GOOD	.62	.39	-.38	.03	.68
STIMULATING	.69	.29	-.34	.07	.69
IRRELEVANT	-.02	-.42	.66	.05	.62
WORTHWHILE	.48	.65	-.29	-.04	.74
VALUABLE	.40	.73	-.22	.06	.75
NECESSARY	.10	.73	-.10	.10	.56
DULL	-.43	-.12	.69	-.14	.67
CHALLENGING	.27	.14	-.10	.76	.69
A WASTE	-.13	-.33	.75	-.02	.69
PRACTICAL	.27	.74	-.15	-.03	.65
DEMANDING	.00	.10	.01	.87	.76
DIFFERENT	.55	-.11	.14	.30	.42
ENJOYABLE	.76	.24	-.26	-.15	.72
ENLIGHTING	.67	.38	-.24	.06	.66
EXCITING	.79	.26	-.13	.03	.71
REWARDING	.64	.44	-.18	-.01	.64
PROVOCATIVE	.64	.20	-.03	.12	.47
GENERAL	-.07	.12	.31	-.36	.25
USELESS	-.11	-.37	.67	-.01	.61
Eigenvalue	9.8559	2.4113	1.6372	1.3463	
% of Variance	41.1	10.0	6.8	5.6	
Cum % of Variance	41.1	51.1	57.9	63.5	

difficulty of the course. High loading adjectives are Difficult, Demanding, Challenging, with Different and Enjoyable also loading slightly above .30. The factor was labeled Difficulty.

The reader is reminded that the naming of factor structures is frequently subject to considerable reinterpretation. Consequently, all efforts to redescribe these structures are encouraged.

The 38 items of the IDEA Survey were also submitted to a principal components factor analysis with rotation against the varimax criterion. Eight factors with eigenvalues greater than one were extracted accounting for 59.1 percent of the total variance. The eight factors were identified and inspected for characteristic loadings defined as .30 and above. Results of the principal components analysis are summarized in Table 3. Table 4 presents the characteristic items for each of the eight factors and the loadings of those items.

Factor 1 is characterized by a positive faculty teaching style (see Table 4). The instructor "spoke with expressiveness and variety in tone of voice." The lectures were not "dry or dull," and he or she "seemed enthusiastic about the subject matter." The instructor also introduced "stimulating ideas about the subject" and "changed approaches to meet new situations." In general, this factor appears to embody many of the teaching strategies commonly associated with good teaching. The factor was labeled Faculty Teaching Style.

Factor 2 has been labeled Faculty Empathy Towards Students and appears to describe a warm supportive teacher who

TABLE 3

EIGHT FACTOR STRUCTURE OF PRINCIPAL COMPONENTS ANALYSIS/VARIMAX ROTATION FOR IDEA SURVEY (N=1664 CASES)

Variable	Faculty Teaching Style	Faculty Empathy Towards Students	Student Cognitive Gains	Examinations (Tests)	Student Personal Gain	Course Organization	Student Workload (non-reading)	Student Workload (Reading Assignments)	Communality
1	.21	.78	.11	-.03	.09	-.04	-.07	.02	.67
2	.26	.68	.18	-.07	.14	.13	.10	-.22	.66
3	.15	.79	.13	-.10	.10	.11	-.05	.04	.69
4	.64	.14	.08	-.09	.07	.18	.09	.11	.51
5	.50	.37	.19	-.01	.15	.17	.07	-.11	.49
6	-.06	.12	-.10	.78	-.02	-.02	.01	-.01	.63
7	.75	.11	.10	-.06	.15	.20	.07	.05	.65
8	.41	.13	.31	-.03	.06	.45	.03	.17	.52
9	-.69	-.10	-.24	.15	-.10	-.14	.03	-.01	.60
10	.15	.13	.23	-.03	.07	.71	-.03	.14	.63
11	.04	.30	-.08	-.14	.37	.43	.11	.01	.45
12	-.08	-.02	-.02	.74	-.10	-.22	.09	.04	.62
13	.02	.67	.02	-.13	.13	.24	-.05	.06	.54
14	.25	.15	.21	-.16	.11	.59	.04	-.15	.54
15	.43	.21	.28	.07	.25	.14	.36	.09	.54
16	.16	.09	.18	-.06	.05	.73	.04	.02	.61
17	.35	.06	.26	-.15	.07	.64	.03	-.05	.63
18	.24	.28	.28	.06	.07	.25	-.31	.49	.62
19	-.12	-.12	-.10	.80	-.10	-.08	.13	.10	.72
20	.53	.26	.35	.04	.23	.24	-.02	.23	.64
21	.15	-.02	-.70	.00	-.04	.27	.20	.05	.64
22	.11	.07	-.73	-.07	.07	.20	.12	.04	.62
23	.08	.27	.66	-.04	.26	.09	.03	.08	.60
24	.04	.15	.66	-.09	.22	.21	.16	-.04	.59
25	.06	.13	.60	-.01	.15	.08	.22	-.03	.45
26	.19	.17	.42	.01	.64	.05	.07	-.10	.66
27	.06	.14	.40	-.06	.53	.17	.21	.07	.55
28	.29	-.04	.11	-.11	.67	.03	-.03	.02	.56
29	.05	.21	.07	-.10	.74	.09	-.01	-.04	.63
30	.16	.14	.43	.01	.57	.08	-.14	.08	.59
31	.06	-.09	.01	.09	-.02	-.03	.26	.80	.73
32	-.03	.02	.07	.03	.08	.06	.70	-.14	.53
33	.12	-.08	.04	.16	-.12	-.06	.70	.28	.64
34	.22	.00	.42	-.07	.06	.43	.09	-.01	.43
35	.17	-.11	.27	.09	.02	.14	.63	.31	.65
36	.21	-.07	.49	-.07	.10	.01	-.25	.09	.37
37	.54	.12	.43	-.14	.14	.29	-.02	-.10	.62
38	.30	.06	.61	-.10	.17	.21	-.18	.02	.60
Eigenvalue	10.622	2.930	1.958	1.927	1.477	1.363	1.134	1.038	
% of Variance	28.0	7.7	5.2	5.1	3.9	3.6	3.0	2.7	
Cumulative % of Variance	28.0	35.7	40.8	45.9	49.8	53.4	56.3	59.1	

TABLE 4

CHARACTERISTIC LOADINGS FOR PRINCIPAL COMPONENTS ANALYSIS OF 38 IDEA SURVEY ITEMS

ITEM	FACULTY TEACHING STYLE	LOADING
	Factor 1	
Spoke with expressiveness and variety in tone of voice		.70
Made presentations which were dry and dull		-.69
Seemed enthusiastic about the subject matter		.64
I would like to take another course from this instructor		.54
Introduced stimulating ideas about the subject		.53
Changed approaches to meet new situations		.50
Stimulated students to intellectual effort beyond that required by most courses		.43
Demonstrated the importance and significance of subject matter		.41
Explained course material clearly, explanation to the point		.35
I have a more positive feeling toward this field of study because of the course		.30
	Factor 2	
	FACULTY EMPATHY TOWARDS STUDENTS	
Encouraged students to express themselves freely and openly		.79
Promoted teacher-student discussion		.78
Found ways to help students answer their own questions		.68
Encouraged student comments even when incorrect or irrelevant		.67
Changed approaches to meet new situations		.37
Explained reasons for criticisms of students' performance		.30
	Factor 3	
	STUDENT COGNITIVE GAIN	
Learned fundamental principles, generalization and theories		.73
Gained on learning factual knowledge		.70
Learned to apply course material to improve rational thinking and problem solving		.66
Developed specific skill needed by professional in field		.66
Have more positive feeling toward this field because of this course		.63
Learned how professional in field go ab out gaining new knowledge		.60
Had a strong desire to take this course		.49
Would like to take another course from this instructor		.43
Developed creative capacities		.42
Degree to which the course hung together		.42
Developed sense of personal responsibility		.40
Discovered implications of course material for understanding myself		.43
Introduced stimulating ideas about the subject		.35
Demonstrated importance and significance of subject matter		.31
	Factor 4	
	EXAMINATIONS (TESTS)	
Gave examination questions which were unreasonably detailed (picky)		.80
Gave examinations which stressed unnecessary memorization		.78
Gave examination questions which were unclear		.74
	Factor 5	
ITEM	STUDENT PERSONAL GAIN	LOADING
Developing skill in expressing myself orally or in writing		.74
Gaining a broader understanding and appreciation of intellectual-cultural activity (music, science, literature, etc.)		.67
Developing creative capacities		.64
Discovering implication of course for understanding myself		.57
Developing a sense of personal responsibility		.53
Explained reasons for criticisms of students' performance		.37
	Factor 6	
	ORGANIZATION	
Clearly stated objectives of course		.73
Made it clear how each topic fit into the course		.71
Explained course material clearly, explanation to the point		.64
Summarized material in a manner which aided retention		.59
Demonstrated importance and significance of subject matter		.45
Explained reasons for criticisms of students' performance		.43
Degree to which the course hung together		.43
	Factor 7	
	STUDENT WORK LOAD (NON-READING)	
Amount of work in other (non-reading) assignments		.70
Difficulty of subject matter		.70
I worked harder on this course than on most others		.63
Stimulated students to intellectual effort beyond that usually required		.36
Related course material to real life situations		-.31
	Factor 8	
	STUDENT WORK LOAD (READING ASSIGNMENTS)	
Amount of reading		.80
Related course material to real life situations		.49
I worked harder on this course than on most others		.31

"encourages students to express themselves freely and openly," promotes "teacher-student discussions," "finds ways to help students answer their own questions," and "encouraged student comments even when incorrect or irrelevant." (see Table 4)

Factor 3 appears to describe a dimension labeled Student Cognitive Gain. Some of the characteristic items are "student made high progress in gaining factural knowledge," in "learning fundamental principles, generalizations and theories," and in "learing to apply course material to improve rational thinking and problem solving." Other characteristic items are a perception of the course as "developing specific skills needed by professionals in the field" and "learning how professionals in the field go about gaining new knowledge." The emphasis is definitely on the cognitive rather than personal or affective gain of the student.

Factor 4 clearly relates to the course examinations or tests and has been labeled Examinations (Tests).

Factor 5 appears to identify a dimension of student gain that is more personal or affective than cognitive. Characteristic items are "developing skill in expressing myself orally or in writing," "gaining a broader understanding of intellectual-cultural activity," "developing creative capacities," "discovering implications of the course for understanding myself" and "developing a sense of personal responsibility." Factor 5 has been labeled Student Personal Gain.

Factor 6 clearly relates to the organization and management of the course. A faculty member who received high

ratings on Factor 6 would "clearly state the objectives of the course," "make it clear how each topic fits into the course" and "explain the course material clearly." Factor 6 was labeled Course Organization.

Factor 7 appears to relate to the work load of the course in everything except reading assignments. The primary difference between Factor 7 and Factor 8 is that Factor 7 has high loadings for the two items "amount of work in other (non-reading) assignments" and "difficulty of subject matter." The factor was labeled Student Work Load (non-reading).

Factor 8 appears to overlap somewhat with Factor 7 but the "amount of reading required" stands out as the item with the highest loading. The factor was labeled Student Work Load (Reading Assignments).

Scattergrams of factors and class size

Because the size of the classes involved in this study varied so greatly (from 6 to 82 students), an examination of the relationship between class size to the post-course ARS factor scores and the post-course IDEA factor scores was conducted before proceeding with the canonical variate analysis. Twelve scattergrams (one for each of the four post-course ARS factors and eight IDEA factors) comparing factor scores to class size were examined.

None of the four correlations of post-course ARS factors and class size reached significance ($p < .01$) nor did any of the eight IDEA factors, although Factor 9 (Student Work Load-Reading Assignments) came close with a significance level of

.011. In addition, visual inspection of the plots does not suggest any meaningful departure from linearity, although it is true that some smaller classes did receive scores that are considerably removed from the mean.

Because of the results of the comparison of class size and factor scores as displayed by the scattergrams, it was decided to proceed with the canonical variate analysis and to include all 62 classes that completed both the post-course ARS and the post-course IDEA Survey.

Primary Analysis

In order to determine the degree to which the ARS and the IDEA shared a common variance, while at the same time allowing each set to retain its integrity, canonical variate analysis with a redundancy measure was selected as the appropriate statistical analysis. A canonical variate analysis was conducted over class means on the four factors of the ARS and the eight factors of the IDEA Survey using the Cooley and Lohnes Canonical Correlation Program. A redundancy analysis was computed following the procedures recommended by Cooley and Lohnes (1976).

Overall class means, standard deviation, and inter-factor correlations for both measures are reported in Table 5. Table 6 shows the results of the canonical variate analysis between the two sets of variables.

Three canonical correlations were significant ($p < .001$). The first canonical R was .960, indicating that the optimal linear combination of student ratings on the IDEA and ARS

accounted for 91 percent of the total variance.

The second canonical correlation was .916, accounting for 82 percent of the variance common to the two sets. The third canonical correlation was .613 and accounted for 37 percent of the variance. The reader should note that the squared canonical correlations should not be added to obtain a total amount of shared variance accounted for.

Interpretation of the canonical variate analysis completed for the question was based on the correlation coefficients (sometimes called canonical loadings).

> A canonical loading is the correlation coefficient between responses for a given item and a canonical function. The higher the coefficient, the more the function and item have in common. The square of the coefficient depicts the amount of variance shared by both the item and the function. Consequently, the item coefficient or loading is used when the canonical dimension is ultimately interpreted. The item weight should not be used for this purpose since it is calculated to maximize the derived score covariances across data sets and does not in itself relate to item or function variance. (Wood and Erskine, undated, pp. 11-12)

Table 7 gives the correlation coefficients of the variables with the canonical variates.

Examination of the correlation coefficients of the canonical variate pairs suggests that the first variate describes a Workload dimension. The ARS Difficulty factor correlates negatively with the variate, implying that as the Difficulty factor decreases (i.e., course becomes more difficult) the variate increases. The IDEA Workload (non-reading) factor correlates positively with the factor, again implying that the higher the student perceives the non-reading workload

TABLE 5

MEANS, STANDARD DEVIATIONS, AND INTERFACTOR PEARSON PRODUCT-MOMENT CORRELATIONS FOR ARS AND IDEA

(N=62 CLASSES)
(Decimals Omitted)

	1	2	3	4	5	6	7	8	9	10	11	12	$\bar{X}$	S.D.
1. Interest/Affect (ARS)													.03	.58
2. Practical Value (ARS)	- 25												.03	.50
3. Negative Affect (ARS)	- 16	-37											-.04	.37
4. Difficulty (ARS)	04	-03	08										-.01	.70
5. Faculty Teaching Style (IDEA)	- 53	05	44	-29									-.08	.64
6. Faculty Empathy Towards Students (IDEA)	- 28	-14	07	29	03								.04	.58
7. Student Cognitive Gain (IDEA)	- 12	-47	26	-11	-03	08							.06	.52
8. Examination (Tests) (IDEA)	- 03	04	-19	-24	-03	-01	17						-.06	.54
9. Student Personal Gain (IDEA)	37	27	02	30	16	17	-54	-11					.05	.59
10. Course Organization (IDEA)	00	-37	42	-02	02	-15	09	-12	03				-.01	.52
11. Student Work Load (Non-Reading) (IDEA)	05	-01	-16	-91	17	-22	08	14	-23	05			.11	.73
12. Student Work Load (Reading Assignments) (IDEA)	08	-08	17	00	00	-03	-01	21	04	-09	-15	-	-.18	.72

TABLE 6

SUMMARY OF CANONICAL VARIATE ANALYSIS FOR ARS FACTORS AGAINST IDEA SURVEY FACTORS

(N=61 Classes)

Number of Canonical Variate	Eigenvalue	Canonical Correlation	Wilk's Lambda	Chi-Square	Degrees of Freedom	Sig. Level
1	.921	.960	.006	279.706	32	.001
2	.839	.916	.082	138.775	21	.001
3	.376	.613	.509	37.463	12	.001
4	.184	.430	.815	11.321	5	.045

Canonical Weights for ARS Variables	CONVAR 1	CONVAR 2	CONVAR 3	CONVAR 4
1. Interest/Affect	-.419	-.630	.535	.551
2. Practical Value	-.124	-.340	-.628	.883
3. Negative Affect	.206	.410	.261	.992
4. Difficulty	.863	-.507	.032	-.083

Canonical Weights for IDEA Variables	CONVAR 1	CONVAR 2	CONVAR 3	CONVAR 4
1. Faculty Teaching Style	.188	.695	-.359	.450
2. Faculty Empathy Towards Students	.170	.137	.134	-.477
3. Student Cognitive Gain	.305	.503	.175	-.592
4. Examinations (Tests)	.119	-.028	-.265	-.290
5. Student Personal Gain	.309	.195	-.526	-.348
6. Course Organization	.124	.278	.597	.192
7. Student Work Load (Non-Reading)	-.824	.323	-.042	-.268
8. Student Work Load (Reading Assignments)	-.075	.134	.356	.353

of the course, the higher the variate score for that course. Other factors significantly correlating with the variate are ARS Interest?Affect (correlation is positive, implying the factor loads in the non-preferred direction), ARS negative affect (non-preferred direction), IDEA Faculty Emphathy Towards Students (non-preferred direction), and IDEA Student Personal Gain (non-preferred direction). In summary, a high score on the first canonical variate would describe a difficult course with a high amount of student non-reading workload, a course that is not perceived as very interesting by the students and that the students do not feel contributes very much to their personal growth. The instructor of the course is not perceived as demonstrating a great deal of empathy towards students.

In order to differentiate between a variable that correlates positively ($r > 0$) with a given variate and a variable whose correlation coefficient indicates that the correlation between the variable and the variate is in the preferred direction (e.g., course is extremely interesting, contributes to high student cognitive gain, is not at all dull, etc.) the term "positive" will be used only in the numerical sense and the terms "preferred" or "preferred direction" will be used to connote the usual desired direction.

The second canonical variate describes what has been labeled as Interest/Challenge. The variables most highly correlated with this variate are IDEA Faculty Teaching Style (preferred direction), ARS Interest/Affect (preferred direction), ARS Negative Affect (preferred direction), ARS

TABLE 7

CORRELATION COEFFICIENTS OF VARIABLES WITH CANONICAL VARIATES

ARS AND IDEA FACTOR SCORES

VARIABLE	CONVAR I	CONVAR II	CONVAR III	CONVAR IV
ARS 1 Interest/Affect	.379	-.633	-.454	-.168
ARS 2 Practical Value	.118	-.317	.860	-.382
ARS 3 Negative Affect	-.388	.593	-.410	-.574
ARS 4 Difficulty	-.864	-.494	-.095	.001
IDEA 1 Faculty Teaching Style	-.099	.777	.427	-.367
IDEA 2 Faculty Empathy Toward Students	-.418	.114	.053	.554
IDEA 3 Student Cognitive Gain	-.068	.434	-.484	.512
IDEA 4 Examinations (Tests)	.251	.053	.168	.359
IDEA 5 Student Personal Gain	-.404	-.002	.580	-.076
IDEA 6 Course Organization	-.122	.331	-.566	-.199
IDEA 7 Student Work Load (Non-Reading)	.874	.398	.057	.138
IDEA 8 Student Work Load (Reading Assignments)	-.013	.054	-.222	-.323

Difficulty (more difficult direction) and IDEA Cognitive Gain (preferred direction).

The third significant canonical variate was labeled High Affect/Low Utility. The variables most highly correlated with this variate are ARS Practical Value (non-preferred direction or little practical value), ARS Interest/Affect (preferred direction), IDEA Personal Gain (preferred direction), IDEA Course Organization (non-preferred direction) and IDEA Cognitive Gain (non-preferred direction).

The overlap between two sets of variables as indicated by their canonical correlations can be misleading (Tatsouka, 1973), particularly if there is high intervariable correlation. Although the variables used in this analysis are factor scores and hence for any given student the ARS factors are presumably orthogonal to each other, as are the IDEA factor scores, by the time class means for each factor are generated, the orthogonality has been lessened as illustrated by Table 5.

A measure which is both a function of the variance extracted and the variance in one factor explained by the other is the redundancy. It is the product of the variance extracted and the canonical R^2 (Cooley and Lohnes, 1976). Results of the redundancy analysis for this canonical correlation analysis are presented in Table 8.

Table 8 indicates that 61.6 percent of the variance in the ARS can be accounted for by student ratings of instruction as measured by the IDEA Survey. In other words, over half of the variance associated with student attitudes towards a

TABLE 8

COMPONENTS OF REDUNDANCY MEASURE OF ARS FACTOR SCORES AGAINST IDEA FACTOR SCORES

CANVAR NO.	CANONICAL R	R^2 λ	VARIANCE EXTRACTED	REDUNDANCY $\lambda.V_E$
		IDEA		
1	.960	.921	.150	.138
2	.916	.839	.135	.113
3	.613	.376	.144	.054
4	.430	.184	.125	.023
TOTAL			.554	.328
		ARS		
1	.960	.921	.256	.236
2	.916	.839	.274	.230
3	.613	.376	.336	.126
4	.430	.184	.126	.023
TOTAL			.992	.615

course as measured by the ARS can be explained in terms of students ratings of instruction. Conversely, a third of the variance associated with student ratings of instruction can be explained in terms of student attitudes toward the course.

In summary, the canonical variate analysis of the ARS and IDEA factors yielded three significant canonical variates labeled Workload, Interest/Challenge, and High Affect/Low Utility. A redundancy analysis demonstrated that 61.5 percent of the variance in the ARS can be accounted for by the IDEA and 32.8 percent of the variance in the IDEA Survey can be accounted for by the factors of the ARS.

DISCUSSION OF RESULTS

Summary

Two large bodies of literature--one dealing with the theory and measurement of attitudes; the second with student ratings of instruction--have developed along parallel rather than intersecting paths. The literature on the development and formation of attitudes has a strong, though diverse, theoretical base, extending back to 1862 and Spencer's First Principles (Allport, 1967). The literature on student ratings of instruction is not only younger (first recorded use of student ratings of instruction was in 1922) but has developed out of practical rather than theoretical considerations. While social scientists interested in the theory and measurement of attitude press to understand, predict, and, at times, change, human behavior, educators' work on student

ratings of instruction has stressed the development of a reliable and valid measure of the effectiveness of instructors (usually in order to reward the good and weed out the bad). Current work on student ratings of instruction has begun to stress their use in the improvement of instruction. This study was an attempt to bridge the gap between those two bodies of literature.

The two instruments used in the study were the Adjective Rating Scale (ARS) (Kelly et al., 1976), a measure of course-oriented attitudes, and the Instructional Development and Effectiveness Assessment Survey (IDEA Survey), a student rating of instruction instrument developed at the Center for Faculty Evaluation and Development in Higher Education at Kansas State University. Both instruments were factor analyzed. The ARS factor analysis yielded four factors labeled: Interest/Affect, Practical Value, Negative Affect, and Difficulty. The factor analysis of the IDEA Survey resulted in eight factors labeled: Faculty Teaching Style, Faculty Empathy Toward Students, Student Cognitive Gain, Examinations (tests), Student Personal Gain, Course Organization, Student Workload (non-reading), and Student Workload (reading assignments).

Factor scores were generated for each student on each of the factors, and these factor scores became the variables used in the analysis of the question investigated.

Class means for each of the ARS and IDEA Survey factors were generated and the relationship between these two sets of class mean factor scores was examined through

canonical variate analysis. The results demonstrated that student attitudes toward a course and student ratings of instruction were highly related. Table 9 illustrates that this relationship can be thought of as comprising three function or dimensions. These functions or dimensions describe the way attitudes and student ratings of instruction overlapped in this study.

The dimensions described in Table 9 are intuitively logical. Dimension 1 appears to describe an extremely difficult course, taught by an instructor with little empathy towards students. Dimension 2 is the most positive of the three and describes an instructor with a "good" teaching style and a course with high Interest/Affect. Dimension 3 describes a course with little practical value, but with high affect and high student personal gain. Such a course is perceived as personally satisfying, but not very pragmatic or practical.

The dimensions described in Table 9 are strong ones. The first two dimensions had eigenvalues of .92 and .84 respectively; the third dimension, an eigenvalue of .38. An eigenvalue represents the amount of variance in one canonical variate (dimension) that is accounted for by the other canonical variate (dimension). Since a correlation coefficient, canonical or otherwise, between A and B is always equivalent to that between B and A, it makes no difference mathematically which set of variables is considered to be the dependent variable and which the independent variable (Nie et al., 1975).

TABLE 9

DIMENSIONS THAT DESCRIBE THE OVERLAP BETWEEN STUDENT ATTITUDES TOWARD A COURSE AND STUDENT RATINGS OF INSTRUCTION

Dimension 1* Workload	Dimension 2 Interest/Challenge	Dimension 3 High Affect/Low Utility
Very Difficult Course (ARS)**	High Interest/ Affect (ARS)	Very Littile Practical Value (ARS)
Moderately Negative Affect (ARS)	Low Negative Affect (ARS)	High Interest/ Affect (ARS)
Moderately Low Interest/Affect (ARS)	Moderately High Difficulty (ARS)	Moderately High Negative Affect (ARS)
High Student Workload (non-reading) (IDEA)	Moderate Amount of Course Practical Value (ARS)	High Student Personal Gain (IDEA)
Low Faculty Empathy Toward Students (IDEA)	Good Faculty Teaching Style (IDEA)	Little Student Cognitive Gain (IDEA)
Little Student Personal Gain (IDEA)	Moderately High Student Cognitive Gain (IDEA)	Moderately Good Faculty Teaching Style (IDEA)
	Moderately High Student non-reading Workload (IDEA)	
	Moderately Good Course Organization (IDEA)	

* Only significant canonical functions ($p < .001$) are included

** Only factors that correlate $\geq .30$ with variates are included

However, canonical correlation analysis chooses a linear combination of variables from the first set that maximally correlates with a linear combination of variables from the second set, and it is possible, of course, that the highest correlation between two sets of variables could be produced by a function or dimension which was high correlated with only one of the variables in each set. This would yield a high canonical R^2 (eigenvalue) if the two variables were highly correlated but would not extract much of the battery variance if only one of the variables in each set had a large correlation with the dimension.

Since a primary purpose of this study was to investigate the direction and intensity of the relationship between attitudes and ratings of instruction, the intensity of this relationship was further analyzed. This further analysis, termed a "redundancy analysis," is a measure which is a function both of the variance extracted from each set of variables and the correlation between the two sets of variables that make up the function or dimension. The redundancy analysis calculated for this canonical correlation demonstrated that approximately 62 percent of the variance in the Adjective Rating Scale is accounted for by student responses to the IDEA, and 33 percent of the variance in the IDEA Survey is accounted for by the ARS. In summary, this analysis demonstrated that student attitudes toward a course and student ratings of instruction, while not overlapping 100 percent, are very similar constructs.

Implications of the Findings

Several implications seem reasonable to draw from the results of this investigation. First, and perhaps most important, it is clear that students' course-oriented attitudes and student ratings of instruction have much in common, perhaps enough in common to be considered the same construct.

Rokeach (1970) offered one explanation of why research on attitude measurement and the rapidly expanding literature on student ratings of instruction have developed along parallel rather than intersecting paths. He noted that attitude theorists are generally more interested in the theory and measurement of attitudes toward objects, across situations, rather than in the theory and measurement of attitudes toward situations, across objects. "The splitting-off of attitude-toward-situation from attitude-toward-object has, (in his opinion) severely eetarded the growth of attitude theory" (p. 119). If a course can be considered a situation (as this investigator believes), then this study will hopefully encourage social scientists who are interested in the theory and measurement of attitudes to include courses, or a course, as an acceptable attitude generating situation. By the same token, it is also hoped that researchers interested in student ratings of instruction will begin to draw more from the theories and techniques of attitude measurement in developing their instruments, designing their research studies, and interpreting their findings.

Since student ratings of instruction have become a part of the evaluation of instruction in many colleges, it is imperative that we begin to develop theoretical or conceptual models that will help us interpret such ratings. Current theories of attitude formation and measurement seem to be a useful place to search for our first tentative models. Such a search is more difficult than it might appear, first, because, as already mentioned, most of the research on attitudes has concentrated on attitudes toward objects across situations and, second, because the literature on attitude formation and measurement is itself so diverse. In 1970 Rokeach gave the following extended definition of attitude.

> An attitude is a relatively enduring organization of interrelated beliefs that describe, evaluate, and advocate action with respect to an object or situation, with each belief having cognitive, affective, and behavioral components. Each of these beliefs is a predisposition that, when suitably activated, results in some preferential response toward the attitude object or situation, or toward others who take a position with respect to the attitude object or situation, or toward the maintenance or preservation of the attitude itself. Since an attitude object must always be encountered within some situation about which we also have an attitude, a minimum condition for social behavior is the activation of at least two interacting attitudes, one concerning the attitude object and the other concerning the situation, (p. 132).

This investigator believes that the items on a typical student rating of instruction form fit the definition of a set of interrelated beliefs mentioned above, and that the total set of these beliefs forms an attitude toward a course.

Hence, student ratings of instruction are, in essence, measures of attitude. It is not being proposed that the individual items on a student rating form measure attitudes, but rather that they measure beliefs; some of these beliefs are descriptive of class or instructor characteristics; others are evaluative. None of the items on student rating forms measure behavior, although some rating forms call for students to express a behavioral preference such as "I would like to take another class from this instructor."

There are many difficulties in interpreting a definition of attitude when one is accepted, and to say that items on a student rating of instruction form represent a set of beliefs that comprises an attitude does not mean that definitional problems are solved. First, we do not know if student rating forms tap all the beliefs that constitute an attitude toward a course, nor do we know which of these beliefs are subject to change based on the course content, teacher behaviors, interaction with other students, etc. Nor, is it clear, even if we accept Rokeach's definition, exactly what is the object and what is the situation to which he refers. Is the instructor the object and the course the situation, or are the instructor and the course both objects with the educational environment the situation? Such questions still have to be answered.

Placing student ratings of instruction into a theoretical framework is more than just an intellectual game. Practical considerations arise when we consider the behavioral components of attitudes. "Does a student with a positive attitude toward

a course study harder, learn more, take another course from the instructor, take another course in the same area, change majors, stay in school?" are all relevant questions in higher education today. Without a theoretical framework, investigators have relied on correlational analysis to attempt to answer such questions.

Limitations

It should be noted that the psychometric properties of the IDEA Survey have not been thoroughly examined. A principal components analysis of the instrument yielded eight factors that were shown to have much in common with the factors of an instrument designed to assess student attitudes toward a course, namely the Adjective Rating Scale. However, the IDEA Survey is a complex, multidimensional instrument and all the psychometric properties of the instrument were not examined in this study, nor has an examination of such properties been previously published.

For example, Chapman, Holloway, and Kelly (1977) used the ARS in combination with a new measure called the Classroom Behavior Survey to predict low and high achievers in a Personalized System of Instruction (PSI) course in psychology developed at Syracuse University and taught to high school juniors and seniors. They reported that Teacher Enthusiasm, as measured by the CBS, was still a significant predictor of student achievement even after the contribution of high school grade point average had been entered in a multi-group stepwise discriminant analysis. This result is important because the frequency and format of teacher behavior during

instruction had been severely curtailed and redefined in the course.

The implications of this study are limited by two classes of variables, instrumentation, and environmental factors including sampling.

Low or unknown reliability is a pervasive problem with measures of attitude generally, and this study has not escaped this issue. Little information was available on either the test-retest reliability or the parallel form reliability of the measures used in this study. The Theta reliabilities computed for each factor (see Appendix) are a measure of internal consistency, and they demonstrate the potential instability of some of the factors used in this study.

Far more information was available concerning the Adjective Rating Scale than was available for the IDEA Survey. Both of these instruments are appealing to faculty for various reasons. The IDEA Survey has a unique method of reporting student opinion data back to faculty, a method that takes instructors' goals for the course as well as student perceptions into account. The IDEA Survey is currently in use in over 30,000 classrooms across the county, but empirical data on the instrument is sorely lacking.

Although more information is available on the ARS, further investigation of this instrument--its validity and reliability--and its factor structure when taken over other levels of programming appears to be a promising direction for further research. The ARS is easy to administer, and,

with its course, as opposed to teacher behavior orientation, is relatively non-threatening to most faculty.

This study was also limited by environmental factors. The faculty participating in the study were self-selected and were not a random sample of Cortland College faculty members, much less of, higher education faculty in general. Although an attempt was made to include all departments in the college and both lower level and upper level courses, the only incentive for faculty to participate in the study was interest in their students' opinions and friendship with the principal investigator.

Finally, there is a limitation common to all multivariate analyses. Canonical variate analysis allows the investigator to maintain the integrity of distinct variable sets while examining the relationship between the two sets. It was an appropriate statistical procedure for this study. However, the results, as with most multivariate procedures, are difficult to interpret. Cross validation of the results in the manner suggested by Wood and Erskin (undated) is also needed.

APPENDIX

1. Post-Course Adjective Rating Scale

2. IDEA Student Survey

3. Theta Reliabilities of factor scores

IDEA SURVEY FORM -- STUDENT REACTIONS TO INSTRUCTION AND COURSES

Your thoughtful answers to these questions will provide helpful information to your instructor.

• Describe the frequency of your instructor's teaching procedures, using the following code:

1 — Hardly Ever
2 — Occasionally
3 — Sometimes
4 — Frequently
5 — Almost Always

The Instructor:

1. Promoted teacher-student discussion (as opposed to mere responses to questions).
2. Found ways to help students answer their own questions.
3. Encouraged students to express themselves freely and openly.
4. Seemed enthusiastic about the subject matter.
5. Changed approaches to meet new situations.
6. Gave examinations which stressed unnecessary memorization.
7. Spoke with expressiveness and variety in tone of voice.
8. Demonstrated the importance and significance of the subject matter.
9. Made presentations which were dry and dull.
10. Made it clear how each topic fit into the course.
11. Explained the reasons for criticisms of students' academic performance.
12. Gave examination questions which were unclear.
13. Encouraged student comments even when they turned out to be incorrect or irrelevant.
14. Summarized material in a manner which aided retention.
15. Stimulated students to intellectual effort beyond that required by most courses.
16. Clearly stated the objectives of the course.
17. Explained course material clearly, and explanations were to the point.
18. Related course material to real life situations.
19. Gave examination questions which were unreasonably detailed (picky).
20. Introduced stimulating ideas about the subject.

• On each of the objectives listed below, rate the progress you have made in this course compared with that made in other courses you have taken at this college or university. In this course my progress was:

1 — Low (lowest 10 per cent of courses I have taken here)
2 — Low Average (next 20 per cent of courses)
3 — Average (middle 40 per cent of courses)
4 — High Average (next 20 percent of courses)
5 — High (highest 10 per cent of courses)

Progress on:

21. Gaining factual knowledge (terminology, classifications, methods, trends).
22. Learning fundamental principles, generalizations, or theories.
23. Learning to apply course material to improve rational thinking, problem-solving and decision making.
24. Developing specific skills, competencies and points of view needed by professionals in the field most closely related to this course.
25. Learning how professionals in this field go about the process of gaining new knowledge.
26. Developing creative capacities.
27. Developing a sense of personal responsibility (self-reliance, self-discipline).
28. Gaining a broader understanding and appreciation of intellectual-cultural activity (music, science, literature, etc.).
29. Developing skill in expressing myself orally or in writing.
30. Discovering the implications of the course material for understanding myself (interests, talents, values, etc.).

• On the next four questions, compare this course with others you have taken at this institution, using the following code:

1 — Much Less than Most Courses
2 — Less than Most
3 — About Average
4 — More than Most
5 — Much More than Most

The Course:

31. Amount of reading
32. Amount of work in other (non-reading) assignments
33. Difficulty of subject matter
34. Degree to which the course hung together (various topics and class activities were related to each other)

• Describe your attitudes toward and behavior in this course, using the following code:

1 — Definitely False
2 — More False than True
3 — In Between
4 — More True than False
5 — Definitely True

Self-rating:

35. I worked harder on this course than on most courses I have taken.
36. I had a strong desire to take this course.
37. I would like to take another course from this instructor.
38. As a result of taking this course, I have more positive feelings toward this field of study.
39. I have given thoughtful consideration to the questions on this form.

• Describe your status on the following by blackening the appropriate space on the Response Card.

A. To which sex-age group do you belong?

1 — Female, under 25
2 — Male, under 25
3 — Female, 25 or over
4 — Male, 25 or over

B. Do you consider yourself to be a full-time or a part-time student?

1 — Full-time
2 — Part-time

C. Counting the present term, for how many terms have you attended this college or university?

1 — 1 term
2 — 2 or 3
3 — 4 or 5
4 — 6 or more

D. What grade do you expect to receive in this course?

1 — A
2 — B
3 — C
4 — D or F
5 — Other

E. What is your classification?

1 — Freshman
2 — Sophomore
3 — Junior or Senior
4 — Graduate
5 — Other

F. For how many courses have you filled out this form during the present term?

1 — This is the first course
2 — 2 or 3 courses
3 — 4 or more courses

G. How well did the questions on this form permit you to describe your impressions of this instructor and course?

1 — Very well
2 — Quite well
3 — Not very well
4 — Poorly

If your instructor has extra questions, answer them in the space designated on the Response Card.

Your comments are invited on how the instructor might improve this course or teaching procedures. Use the back of the Response Card (unless otherwise directed).

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POST COURSE SURVEY

You are being asked to participate in a Research Project on Student Ratings of Collegiate Instruction. The study is being conducted by a graduate student at Syracuse University and your instructor will not see any of your individual responses, only class averages will be reported back to your instructor. Please answer truthfully according to your opinions about this class as of this moment.

You should have one Post Course Survey (this sheet), one IDEA Survey Form (Gold), one Response Card, and a pencil.

PLEASE ANSWER THE QUESTIONS ON THIS SHEET FIRST

1. In the space marked "institution" write your student number.

   This is important - your student number will enable us to match your precourse opinions with your postcourse opinions without jeopardizing your anonymity.

2. Fill in the boxes labeled "instructor", "course number", "hour and days class meets", (ex. 10:00 M,W,F).

3. Find the section labeled "extra questions" (items 40-64) on the response card and answer the following questions.

   40. I would recommend to my best friend:

   1) they take this course from this instructor,
   2) they take this course, but from a different instructor,
   3) they take a different course from this instructor, but not this one,
   4) they take neither this course nor this instructor.

For items 41 through 64 use the following code:

1 = Extremely, 2 = Very, 3 = Somewhat 4 = Not at all

I found this course at Cortland to be:

41. Interesting
42. Boring
43. Relevant
44. Informative
45. Difficult
46. Good
47. Stimulating
48. Irrelevant
49. Worthwhile
50. Valuable
51. Necessary
52. Dull
53. Challenging
54. A Waste
55. Practical
56. Demanding
57. Different
58. Enjoyable
59. Enlightening
60. Exciting
61. Rewarding
62. Provocative
63. General
64. Useless

Now turn to the Gold IDEA Survey Form and answer items 1 through 39 plus items A through G. All spaces on your Response Card should be used.

Thank You For Your Help

TABLE 10

THETA RELIABILITIES FOR ALL FACTORS USED IN THIS STUDY

	I	II	III	IV	V	VI	VII	IX
Pre-Course ARS	.90	.63	.49	.36	.05			
Post-Course ARS	.94	.61	.41	.27				
IDEA Survey	.95	.69	.51	.50	.34	.28	.26	.05
ARS Matched Group	.92	.61	.46	.33				
IDEA Matched Group	.94	.70	.52	.52	.36	.28	.14	.02

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